

In this issue of *Ecocycle* we talk about sustainable development indicators, the ISO 14000 series,

Thus, there are a couple of challenges which need to be addressed. First, there needs to be more work done on the linkages and cross-cutting issues which tie related concepts such as life-cycle management, eco-efficiency and extended producer responsibility together. Those at the cutting edge of new policy should always keep in mind the relationships

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between what we do and what our colleagues working on a related area do. We need to understand the steps between policy development, pilot projects, and implementation. We need to think always about how we should be promoting and communicating the new tools.

To use the words of diplomacy and international gatherings, we need a "chapeau". A hat, an umbrella, a framework under which these new emerging policies and tools can fit. A conceptual structure which ties it all together. That's the first challenge.

The next is to communicate our new understandings and do so in ways which will make sense to a wide audience that does not have time for fancy language, acronyms and bureaucratised. We will need to think about how we explain the concepts and the tools in simple language. We have to be able to show why the investment of time and money will pay off for the environment and for business. The public needs to be brought along too. Consumers have a major role to play in rewarding those who have made the technological and environmental leaps to new products which incorporate life-cycle thinking and pollution prevention principles.

Ecocycle has a small role to play in meeting these challenges. We hope that with this issue we can continue to communicate and explore the concepts, provide a forum for new ideas and facilitate the process of bridging the gaps and building the necessary "chapeau". No chapeau and we all get wet.

OECD's eco-efficiency program

In 1995, the Organisation for Economic Co-operation and Development (OECD) held a workshop in Norway to clarify several concepts related to sustainable consumption and production. Participants discussed "eco-space", "ecological footprints", "ecological rucksacks", "green accounting" and "eco-efficiency". Workshop participants identified "eco-efficiency" as one of the most useful of these concepts.

The World Business Council for Sustainable Development (WBCSD) has defined eco-efficiency as follows:

Eco-efficiency is reached by the delivery of competitively-priced goods and services that satisfy human needs and

bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the earth's estimated carrying capacity (BCSD, 1993).

Eco-efficiency was seen by those attending the Norway workshop as a flexible and pragmatic approach, suitable for translation into action by governments, industry, other organizations, and households. However the term was viewed as too obscure for popular communication and the concept was seen as insufficient on its own to be the basis for policy making. In particular a wider understanding would be needed of the links between

publisher's message

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economic activity and environmental damage.

In their February 1996 communiqué, OECD Environment Ministers stated that "eco-efficiency is a ... strategy which Ministers viewed as highly promising to enable industry, governments and households to decouple pollutant release and resource use from economic activity. Ministers noted the existence of studies which suggested that efficiency improvements of a factor of ten were both necessary and achievable in the next thirty years. They encouraged the OECD to work with the World Business Council for Sustainable Development and others to assess the potential of eco-efficiency to this end."

Eco-efficiency builds on the existing concepts of cleaner production and can be applied to any type of good or service in any sector. The concept aims for "break-through" innovation and will rely on indicators and monitoring as

key elements. A workshop in Berlin in July 1997 explored the application of the concept to the transport sector. Another workshop held in Paris in September 1997 reviewed existing efforts to apply eco-efficiency and to consider the role of governments in fostering the concept.

The OECD's eco-efficiency work program is focusing on such questions as whether the economy can grow and become cleaner simultaneously. How does eco-efficiency link with and support sustainability concepts? How will the necessary social and technological innovation take place and how can governments promote these objectives in their research, development, demonstration, and procurement programs? What are the barriers and how can they be overcome?

The OECD work is leading towards identifying roles for governments and the OECD in the development and promotion of

eco-efficiency. Discussion is focusing on areas such as leadership to establish shared goals for sustainable development; working with stakeholders; promoting research, development and experimentation; providing a framework for innovation; and monitoring and benchmarking progress.

A draft report on eco-efficiency is circulating within the OECD for comment and is expected to be released for distribution in the spring.

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integrated solid waste management

The concept of sustainable development is predicated on the principles of responsible use of the planet's resources and protection of the environment. Inherent in these principles is the fundamental need for society to minimize waste production, and to protect health by effectively managing the wastes that are inevitably generated by human activity. Consequently, most countries have adopted national policies based on the concept of the "waste management hierarchy" as the

preferred approach to managing municipal solid waste (MSW). Although the original philosophy of the "hierarchy" was simply to provide a menu of available options, the term now spuriously implies a strict and exhaustive top-down approach to managing MSW. Clearly, reduction, reuse and recycling practices can be valuable approaches to helping achieve a certain level of sustainability. However, practical experience is demonstrating that there are limitations to the extent these

options can manage waste in an environmentally sound, practical and cost effective manner.

Municipalities are now considering integrated approaches to manage MSW. To avoid any potential confusion, the term "integrated solid waste management" (ISWM) does not necessarily imply the use of:

- incineration or energy-from-waste technologies,
- wide-ranging multi-component recycling programs, or

integrated solid waste management

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- a strategy which incorporates all available waste management options.

Rather, ISWM could be better defined as:

“An optimized system of waste management practices for a given jurisdiction, based on the sound evaluation of site-specific environmental, energy, economic and socio-political considerations, which includes one or more waste management options.”

To address environmental and economic concerns, life-cycle assessment (LCA) and life-cycle management (LCM) methods have emerged as useful tools in helping to select MSW management strategies. Currently, there are several LCA/LCM-based waste management models which are designed to provide a structured framework for addressing specific aspects of waste management. Examples of these models include:

- ◆ ORWARE (Organic Waste Research) Model - a computerized simulation developed for the Swedish Waste Research Council by the Swedish Royal Institute of Environment to evaluate the various methods for treating organic-based waste components. The model contains several modules for assessing emissions from management options such as transportation, composting, incineration, anaerobic digestion and landfilling.
- ◆ MIMES/WASTE Model — a computerized optimization model for waste management systems developed for the Swedish Waste Research Council and the Swedish

National Board for Industrial and Technical Development by Chalmers University. The model has been used in several case studies but is currently limited to considering a maximum of only eight emission factors.

- ◆ Application of Life-Cycle Management to Evaluate Integrated Waste Management Strategies — a model is in the latter stages of development under a US Environmental Protection Agency project to help evaluate the relative costs and environmental burdens of ISWM strategies. The model's application is not suited to making comparative evaluations on the environmental preference of alternative technologies or products.
- ◆ Proctor & Gamble Life Cycle Inventory Model — a tool developed by Proctor & Gamble to assist with comparing future integrated waste management options and to optimize existing systems (see “Integrated Solid Waste Management - A Lifecycle Inventory” by P.R. White, M. Franke and P. Hindle, Pub: Blackie Academic & Professional). The model is currently being revised.
- ◆ A Canadian Waste Management Model — this tool was developed for Corporations Supporting Recycling and the Environment & Plastics Institute of Canada by Proctor & Redfern Ltd. It is an environmental life-cycle inventory and economic cost analysis tool for ISWM, and was designed specifically to provide guidance to municipal officials developing appropriate waste manage-

ment strategies (see “An LCA Tool for Integrated Solid Waste Management” on page 5).

These models have inherent limitations in their application, due mostly to constraints within the life-cycle inventories. As more case studies are conducted and added to these databases, the models will inevitably improve.

Life-cycle assessment and life-cycle management methods have emerged as useful tools in helping to select MSW management strategies.

It is important to note, however, that the issues surrounding ISWM are broad in scope, highly complex and not immune to political influence. Although these tools can provide a disciplined approach to assessing needs, it is difficult for any one model to address all the concerns of a given municipality. Other site-specific issues, such as local socio-economics, emissions risk assessment, demographics, geology and climate, must be considered in concert with the LCA/LCM-based models to better define an optimal ISWM strategy. Furthermore, since waste management issues transcend political boundaries, it is also essential to consider the policies and practices of other jurisdictions.

Ultimately, sound decision-making requires a broad base of knowledge realized through the effective exchange of information

at regional, national and international levels. To address this need in Canada, several existing organizations are collaborating on the establishment of a national Council on ISWM. The primary role envisioned for the Council will be to collect and effectively disseminate within Canada relevant information on domestic and international ISWM experiences. The Council is also likely to utilize existing networks to promote

Canadian experiences internationally.

As a prelude to establishing this organization, a national workshop was held on March 2-3, in Burlington, Ontario. The workshop, drawing on the perspectives of participants from academia, the private sector and government, discussed barriers to implementing effective ISWM strategies, and helped to outline the infrastructure and mecha-

nisms required for more effective information exchange on ISWM.

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an LCA tool for integrated solid waste management



Background

Corporations Supporting Recycling (CSR) and the Environment and Plastics Industry Council (EPIC) are co-sponsoring the development of a software model designed to help Canadian municipalities identify waste management practices and strategies that best fit their individual needs and priorities. The City of London, Ontario, a participant in the project, is the first of several communities that will be testing the model and assisting in its development. Results from the community pilots will be used to update and further improve upon the model. The project is being carried out by Proctor & Redfern under the direction of a steering committee comprised of CSR, EPIC and municipal representatives.

Identifying the Environmental and Economic Effects of Municipal Waste Management Systems

The model enables municipalities to identify the environmental and economic effects of their current waste management systems and effects that may accrue from changes to those systems (e.g. redistributing the flow of identified waste material between the options of recycling, composting, energy recovery and landfill) by examining major materials in the municipal waste stream. These materials include paper, glass, ferrous materials, aluminum, plastics, food waste, yard waste and "other waste" such as textiles, diapers, etc.

Using a life-cycle methodology, it evaluates the environmental

burdens of waste management from the point at which a material is collected curbside to the point at which recyclable material, usable compost or recovered energy is produced. For landfilling, environmental burdens are evaluated to the point at which the landfill becomes environmentally inactive (gas and leachate production cease leaving inert material).

In addition to the environmental burdens, the system's economic costs associated with the collection, processing (recycling and energy recovery), composting, energy recovery and landfilling of materials managed by municipal governments are also analysed. In the case of recycling, where adequate data exists, the environmental effects of processing recovered material into new material are compared with the environmental effects of acquiring virgin raw materials, fuels and the

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production of refined material. Transportation associated with these activities is also considered.

Examining Environmental and Economic Parameters

Estimates of the energy consumed or produced; and the air, waste and land emissions of different waste management practices, and the costs of various practices and changes in the waste management system, are determined. These costs are assessed in terms of the total system (net of revenue from the sale of recyclables, compost and recovered energy) and on a per tonne and per household basis.

Environmental parameters evaluated by the model include:

- energy consumption, as an indicator of resource depletion;
- greenhouse gas emissions - carbon dioxide and methane as indicators of climate change;
- emissions of acid gases - nitrogen oxides (NOx), sulfur oxides (SOx), and hydrogen chloride (HCl) as indicators of acid precipitation;
- emissions of smog precursors - NOx, inhalable particulates (PM-10) and non methane volatile organic compounds (VOCs) as indicators of smog formation;
- air emissions of lead, cadmium, mercury (Pb, Cd and Hg) and trace organics (dioxins) as indicators of health risk;

- water emissions of heavy metals (Pb, Cd and Hg) and trace organics (dioxins) and biological oxygen demand (BOD) as indicators of the impact on water quality; and
- residual solid waste as an indicator of land use disruption.

User Friendliness and the Use of Best Available Data

The input of data unique to a municipality's individual circumstance is readily accommodated by the model's software. To assist users who may not have all the information required by the model — or who would like to quickly identify areas of, or potential changes to, their current waste system that may warrant further investigation — the model contains default values for items such as waste composition, energy consumed by various types of facilities, etc.

The model generates a life-cycle inventory and system cost analysis for the user specified waste management system which includes quantified environmental burdens and the capital, operating and employment costs of the selected system options.

To enable the model to remain relevant in the face of changing waste management system component technologies and the development of improved waste management and production processes, the database on environmental burdens and economic cost factors can be updated. This helps to ensure that the best available data is used in the analysis of the waste management systems.

Municipal Benefits

By defining and linking the environmental and economic elements of recycling programs, on a material by material basis, to those of other options such as energy recovery, composting and landfill, this model helps municipalities:

- optimize existing waste management practices,
- examine new recovery and disposal options for managing particular material and material streams,
- realize the benefits of an integrated and optimized waste management system, and
- prepare "State of the Environment" and/or environmental assessment reports.

Next Steps

The boundaries of the model's framework were developed by drawing upon the ISO 14040 standards on Life-Cycle Assessment and on other life-cycle studies on waste management, including the ongoing studies by the US Environmental Protection Agency and the UK Department of Environment.

Consultations with life-cycle analysis practitioners from the academic, regulatory and industrial communities — and input from municipalities working with the tool — have been and will continue to be key to the ongoing development of this initiative.

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measuring eco-efficiency in business:

developing and implementing energy and material indicators - a feasibility study



The National Round Table on Environment and Economy (NRTEE) and a number of leading North American companies are undertaking a feasibility study in co-operation with the World Business Council for Sustainable Development (WBCSD), to develop eco-efficiency indicators. The purpose of the study is to test the feasibility and value of material and energy intensity indicators to support the goal of eco-efficiency.

Background

The Government of Canada asked the NRTEE to "expand its work with stakeholders and provincial governments to develop eco-efficiency indicators." In response the NRTEE developed an eco-efficiency program to assist companies in developing and implementing a set of measurable eco-efficiency indicators. A background document was prepared which reviewed current practice, and put forward a suite of potential eco-efficiency indicators. The NRTEE, along with the WBCSD and leading representatives from industry, non-governmental organizations (NGOs) and government, met in April 1997 to discuss their experiences in measuring eco-efficiency. This group agreed that the development and testing of indicators for material

and energy intensity held the greatest promise. These measures are particularly relevant because they relate directly to costs. Companies in several countries had already designed and implemented indicators relating to these elements of eco-efficiency. Participants, therefore, recommended building on this work, developing consensus as to indicator design, and implementing indicators within a small number of companies. A second workshop with the volunteer companies was held in Toronto on November 12 to 14, 1997, to discuss and refine the indicators, and to outline a feasibility study for testing them.

Feasibility Study Participants

Eight companies are currently participating in the feasibility study. They are: 3M Canada Company, Alcan Aluminium Limited, Bell Canada, Monsanto, Noranda Mining and Exploration Inc., Northern Telecom Limited, Procter & Gamble Inc., and West Coast Energy (represented by Pacific Northern Gas Ltd.). At the second workshop agreement was reached on the energy and material intensity indicators, a methodology framework and a plan of action for conducting the feasibility study.

Selected Eco-efficiency Indicators

The feasibility study will evaluate an energy intensity indicator

and two potential material intensity indicators. In addition to this minimum set of indicators, six complementary energy indicators were developed. The intent behind these complementary indicators is to allow a company to build on the minimum set of indicators in order to provide a more complete picture related to the company's eco-efficiency performance. For example, with respect to energy, a company will have the choice of tracking energy consumed within a manufacturing site to produce a defined unit of output, or of examining the life-cycle energy consumption associated with a particular product.

Benefits of Participation

It is hoped that the feasibility study will result in the development of cost-effective, credible benchmarks of eco-efficiency for the companies. Potentially eco-efficiency indicators can be used for identifying product and process improvements, providing information to outside stakeholders (e.g. in corporate environmental reports) and developing informed dialogue with customers, shareholders and investors on environmental performance.

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LCA and the Australian food and packaging industries

Australian industry currently faces a number of limitations regarding life-cycle assessment (LCA), including:

- an absence of well-prepared, qualified and accessible local data;
- a lack of wide-spread, cross-disciplinary technical and scientific discussion; and
- a low level of awareness regarding life-cycle assessment and its benefits and constraints to effective use.

Since November 1996, two organizations have been working together to improve the status of LCA development and application in the Australian food and packaging industries: the Centre for Packaging, Transportation and Storage (CPTS) at Victoria University of Technology, Melbourne, and the Co-Operative Research Centre (CRC) for International Food Manufacture and Packaging Science.

Research Activities

During this time, the first comprehensive LCI (life-cycle inventory) study for the Australian food and packaging industry has been initiated. The confidential case study, undertaken for an Australian packaging company, evaluates two different plastic packaging systems for the

same food product by examining the environmental impacts throughout the entire product life cycle. The study is scheduled for completion by November 1998.

In conjunction with the case study, a variety of other research activities have been undertaken, including:

- the collection of Australian data for energy generation, waste management and transport;
- the development of a data management protocol for the food and packaging industry; and,
- the development of an impact assessment methodology specific to Australian conditions.

Carried out through a Ph.D. study, the impact assessment research works to understand environmental impacts and pressures the food and packaging industry place upon Australia (as well as the rest of the world). Another area of Ph.D. research (expected to begin in 1998) is studying the incorporation of life-cycle costing into the methodology and structure of LCA. This research hopes to increase understanding into the interaction between environmental and economic impact analysis, and provide industry with a comprehensive decision-support tool.

LCA research into different

packaging waste management scenarios has started this year. Funded by EcoRecycle Victoria, the research partners of this project are the Australian Co-Operative Research Centre for Waste Management and Pollution Control (CRC WMPC), the Centre for Design at RMIT and CPTS. The study's objectives include: determining the environmental impacts of the existing recycling and landfilling practices of three common packaging products in Victoria, and providing an impartial and transparent research process which better informs stakeholder debate in the area of recycling and waste minimization. Discussions with industrial stakeholders are under way to secure additional funds for application of the research to other packaging products, waste management scenarios and alternative waste collection systems. The ultimate objective of the research is to develop an LCA-based decision-support model for packaging waste management systems.

National Discussion

CPTS is collaborating with the CRC WMPC in other activities, such as:

- LCA awareness raising and education;
- development of a nation-wide scientific discussion platform;



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FOOD MANUFACTURE &
PACKAGING SCIENCE



- selection of suitable, available software tool(s); and
- development of a system for data collection, analysis, validation and access protocols.

CPTS staff are active members of an LCA Round-table forum established in 1996 which meets to discuss developments, needs and opportunities for LCA in Australia. This forum, created in anticipation of the building requirements for the "green" 2000 Sydney Olympics, is comprised of research organization, government, industry and university representatives. It has been proposed that an Institute for Materials Accountability and Sustainability (IMAS) be established within this forum to provide a co-ordinated national response (government, industry and research organizations) to international environmental, trade and sustainability pressures.

Emerging Pressures

Of interest to the food and packaging industry are two documents currently under development:

- the *National Packaging Covenant*, prepared by Commonwealth, State, Territory and local govern-

ments, in conjunction with industry stakeholders, and

- the *Environmental Code of Practice for Packaging*, prepared by the Australian Chamber of Manufactures, the Beverage Industry Environment Council, the Packaging Council of Australia Inc., and the Plastics and Chemicals Industries Association Inc.

Based on the principle of shared responsibility, the Covenant promotes the use of life-cycle assessment and management for the environmental management of packaging and paper products, including their recovery and utilization. Objectives of the Code of Practice include: ensuring that new packaging distributed on the Australian market is evaluated for its environmental impact prior to its introduction, and encouraging the adoption of sound environmental practice as measured by the ISO 14000 series of standards.

Building on the development of the *Environmental Code of Practice for Packaging*, CPTS, with funding assistance from EcoRecycle Victoria, will be conducting a series of LCA workshops for Victoria-based companies involved in packaging pro-

duction and supply, as well as users and distributors of packaging. The purpose of these workshops is to increase participants' awareness and understanding of the Code of Practice, and the benefits and constraints of LCA.

In comparison to other industrialized countries, Australia lags behind in LCA. It is expected this situation will change in the near future given the number of research activities designed to assist the Australian food and packaging industry implement LCA and related measures — enabling the companies to increase their understanding and competitiveness on a local, regional and global scale.

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eco-indicators workshop held in toronto

A one-day workshop, "Eco-Indicators for Products and Material: State of Play '97", was held in Toronto at the Ontario Science Center on November 25, 1997. Workshop participants discussed issues surrounding the development and application of eco-indicators in environmental decision-making. The workshop was organized by the Mineral Technology Branch of the Canada Center for Mineral and Energy Technology (CANMET), with sponsorship from the Mining Association of Canada, the Canadian Portland Cement Association, the Canadian Wood Council, the Canadian Plastics Industry Association and the Canadian Steel Producers Association.

Details on the outcomes of the workshop will be included in upcoming issues of *Ecocycle*, or they may be obtained from:

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ISO LCA update

ISO 14000 - Technical Committee 207

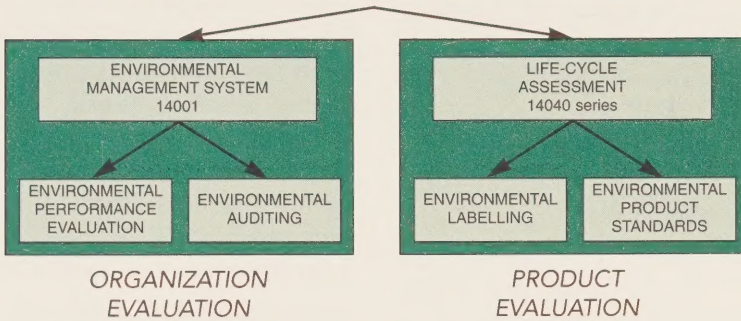


Figure 1

The International Organization for Standardization is progressing rapidly with the development of their environmental management standards — the ISO 14000 series. As illustrated in Figure 1, these standards can be separated into two streams: those with an organizational focus which have the environmental management system (EMS) standard (ISO 14001) as the foundation document, and those with a product focus which have the ISO 14040 series on Life-Cycle Assessment (LCA) as a foundation. While there has been significant attention paid to the EMS standard (published in September 1996), many companies are now recognizing the strategic benefits of addressing both of these approaches to environmental management. A product-oriented environmental focus can complement an EMS by helping companies:

- develop a broader understanding of the environmental impacts, risks and liabilities associated with a product or service;
- get a better return on investment with respect to environmental expenditures;

- improve relationships with suppliers and customers;
- identify key areas for product and process improvements;
- develop indicators that accurately depict the potential environmental impacts of a company's product or service; and
- turn product system data into information that can be used to benchmark a company's progress toward eco-efficiency or sustainable development objectives.

The marketplace acceptance of LCA as a tool to support these types of applications will be dependent on a number of factors. These factors include the availability of databases and software tools to help streamline the conduct and cost of LCA studies, and the acceptance and understanding by government policy makers and regulators of life-cycle approaches to environmental management. Within companies, the senior management ranks need to be convinced that product-focused approaches such as LCA offer opportunities to improve economic and environmental performance.

To support all of the above there is a need for strong international standards for the conduct of LCA studies. The ISO 14040 standards (see Table 1 on the following page) are designed to help:

- LCA practitioners (people who undertake LCA studies) follow a standard process and a common set of decision rules;
- Study proponents (sponsors of LCA studies) have confidence that their LCA study will meet an internationally accepted standard; and
- Target audiences both external (customers, governments, shareholders, and financial institutions) and internal to the company (product designers, senior management, line managers, etc.) have the means to evaluate and interpret LCA results.

Of course, as with all ISO standards, the 14040 series is also designed to help facilitate trade.

By laying out standardized procedures, rules for marketplace applications of LCA (e.g. making an environmental claim about a product in the marketplace), and guidance on the transparent reporting of LCA results, it is hoped that the development of LCA standards by ISO will instill confidence in the use and application of this important environmental management tool.

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table 1: status of the ISO 14040 series LCA standards

Standard	Focus	Status
ISO 14040 - Environmental management <ul style="list-style-type: none"> Life-cycle assessment Principles and framework 	Introduction to the overall framework, principles and requirements for conducting LCA studies, particular guidance on critical review of LCA studies	<ul style="list-style-type: none"> International standard, June 1997
ISO 14041 - Environmental management <ul style="list-style-type: none"> Life-cycle assessment Goal and scope definition and life-cycle inventory analysis 	Guidance on conducting a life-cycle inventory — defining the goal, setting boundaries, mapping out the product system, data collection and handling, reporting of results	<ul style="list-style-type: none"> Final draft international standard Target date for publication, April 1998
ISO 14042 - Environmental management <ul style="list-style-type: none"> Life-cycle assessment Life-cycle impact assessment 	Guidance on structuring the results of an inventory to better understand the environmental relevance of the product system being studied	<ul style="list-style-type: none"> Committee draft Target date for publication, December 1998
ISO 14043 - Environmental management <ul style="list-style-type: none"> Life-cycle assessment Life-cycle interpretation 	Guidance on how to interpret the results of life-cycle inventory and life-cycle assessment studies	<ul style="list-style-type: none"> Committee draft Target date for publication, December 1998
ISO TR 14049 (technical report, not a standard)	Illustrative examples on how to apply ISO 14041	<ul style="list-style-type: none"> First edition draft Target date for publication, June 1998
New Work Item Proposal - LCA data documentation format	Swedish proposal to develop a standard which would help facilitate the communication of LCA data by providing a common electronic format	<ul style="list-style-type: none"> Currently being voted on by the ISO SC5 sub-committee members

OECD international workshop on extended producer responsibility: who is the producer?

Under extended producer responsibility (EPR) policies, producers and importers of products bear a significant degree of responsibility for the environmental impacts of their products throughout the product life cycle, which includes:

- upstream impacts inherent in the selection of materials,
- impacts from the manufacturing/production process itself, and
- downstream impacts from the use and disposal of the products.

Producers accept their responsibility when they design their products to minimize life-cycle environmental impacts, and when they accept legal, physical, or socio-economic responsibility for the environmental elements that cannot be eliminated by design.

In 1994, the Organisation for Economic Co-operation and Development (OECD) initiated a multi-phased project to analyze the legal and administrative approaches to EPR, prepare case studies, review operational systems and identify options for governments wishing to establish an EPR program. The final phase of

this project comprises a series of four international workshops designed to examine the key issues that have emerged from the OECD's research on this evolving area of environmental policy.

The first of the four international EPR workshops was recently hosted by Environment Canada in Ottawa, Canada. From December 2 to 4, 1997, representatives from government, industry, international organizations and environmental groups from 11 OECD member countries, met to examine in detail the topics:

OECD international workshop

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- who is the producer and for what is the producer responsible,
- the roles and responsibilities of all relevant actors in the product's life cycle, and
- the role of producer responsibility organizations.

The proceedings from the Ottawa workshop, which are currently being prepared by the OECD Secretariat, should be available sometime in May.

The second OECD workshop on EPR, "Lifting Limits and Barriers to EPR Approaches", will take place in Helsinki, Finland on May 11-13, 1998. The third EPR workshop will take

place in Washington, D.C. in December 1998. The fourth and final workshop will be held in Paris in May 1999. The final workshop will draw together all the information from the first three workshops and attempt to outline policy options to assist governments considering establishing an EPR program. The final output from the four international workshops will be an EPR Guidance Manual for Governments.

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Good-bye to Andie and Kevin

There have been some recent changes in the *Ecocycle* editorial staff with the departure of Editor, Kevin Brady, and Associate Editor, Andie Paynter. Andie has returned to school to develop her skills as a computer programmer, while Kevin has entered the world of private consulting as a senior associate in the Demeter Group. The two will be missed at Environment Canada though not quickly forgotten for their vision and dedication to *Ecocycle*. Best of luck to both Andie and Kevin in their new endeavours!

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